

## POWER CONNECTOR

### FIELD OF THE INVENTION

5           The present invention relates to a power connector and particularly to a power connector which can be fixed on a circuit board and be used for electrically connecting a matching power connector together.

### BACKGROUND OF THE INVENTION

10           Currently an electronic device is installed with a power connector which is used for receiving the power from a power supply. In portable electronic devices (such as PDAs, notebook PCs, mobile telephones), power connectors are used to charge the power supply or to supply the electronic members in the electronic devices with power in order to make them function.

15           Referring to FIG. 1, a known power connector can be fixed on a circuit board and be electrically connected to a mating connector. The power connector comprises an insulating shell 50, a first terminal 60, and a second terminal 70. The first terminal 60 is located within the insulating shell 50 and has a contact part 601 and a leg part 602. The contact part 601 of the first terminal 60 extends into the accommodating cavity 501 of  
20 the insulating shell 50. The contact part 601 can be used for contacting the terminal of the mating power connector. The leg part 602 of the first terminal 60 extends beyond the insulating shell 50 to be soldered on the circuit board and an electric connection between the first terminal 60 and the circuit board is achieved.

          The second terminal 70 is located within the insulating shell 50 and it has at least  
25 a resilient portion 701 and a leg part 702. The resilient portion 701 extends into the accommodating cavity 501 of the insulating shell 50 so as to contact another terminal of the matching power connector. The leg part 702 of the second terminal 70 can be soldered on the circuit board and an electric connection between the second terminal 70 and the circuit board is achieved.

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The first terminal 60 can receive the positive power supply of the matching power connector and the second terminal 70 can be used as a terminal to be grounded (or receive the negative power supply of the matching power connector), so the electric connection between the power connector and the matching power connector is made:

5        However, the above existing power connector is fixed on the circuit board in such a way that the terminals 60 and 70 are electrically connected with the circuit board by their legs 602 and 702 soldered on the circuit board. With only two small points of contact from legs 602 and 702, a poor mechanical connection can result between the power connector and the circuit especially if there will be many insertions and  
10        withdrawals of the connectors. A poor mechanical connection can result in the greater possibility of a failed electrical connection.

#### SUMMARY OF THE INVENTION

A main object of the present invention is to provide a power connector, which  
15        can be designed so that its second terminal is in a shape of the housing with the whole underside of the terminal soldered to the circuit board. This will create a robust mechanical and electrical connection between the power connector and the circuit board and will allow for many insertions and withdrawals of the mating connectors.

To fulfill the above-mentioned objects, the present invention provides a power  
20        connector which can be fixed on the circuit board. The insulating shell includes an accommodating cavity. A first terminal is disposed in the insulating shell and includes a contact part extending into the accommodating cavity of the insulating shell. A second terminal is in the form of a metal housing covering the outer surface of the insulating shell and includes a resilient arm extending into the accommodating cavity  
25        of the insulating shell. The underside of the metal housing can be soldered to the circuit board.

The characteristics and the technical contents of the invention will be better understood by combining the detailed description and the accompanying drawings. But it is to be understood that the invention is not limited to the specific embodiments  
30        except as defined in the claims.

## DESCRIPTION OF THE DRAWING

The particular aspects and the advantages of the invention will be evident with reference to the embodiments of the invention described in detail hereinafter and  
5 considered in connection with the accompanying drawings, in which:

FIG. 1 is a perspective drawing of a known power connector;

FIG. 2 is a perspective exploded view of a power connector of the present invention;

FIG. 3 is a perspective exploded view of a power connector of the present  
10 invention from another view point;

FIG. 4 is a perspective drawing of a power connector of the present invention;

FIG. 5 is a perspective drawing of a power connector of the present invention from another view point;

FIG. 6 is a perspective drawing of the insulating shell of a power connector of the  
15 present invention from another view point.

## DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a power connector which can be fixed on a circuit board and be used to electrically connect mating power connectors together to  
20 receive power in order that the circuits on the circuit board can function.

Referring to FIGS. 2, 3, 4 and 5, the power connector of the present invention comprises an insulating shell 10, a first terminal 20 and a second terminal 30. The insulating shell includes a front end face 101 through which the mating power connector is inserted, a rear end face 102, and a peripheral wall 103 connecting the front end face  
25 101 and the rear end face 102. The insulating shell 10 forms an accommodating cavity 104 between the front end face 101 and the rear end face 102. The cavity is open through the front end face 101. In this embodiment, the insulating shell 10 is approximately a rectangle and the peripheral wall 103 includes upper, lower, right and left walls.

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A fixing slot 105 is formed on the rear end face 102 of the insulating shell 10 (seen from FIG. 6). It extends toward the inside of the shell. A flange 106 is formed on the peripheral edge of the front end face 101 of the insulating shell 10. An engaging member 107 is formed as a projection on a side wall of the peripheral wall 103 of the insulating shell 10. The flange 106 and the engaging member 107 can be used for fixing the second terminal 30 on the insulating shell 10.

The first terminal 20 is made of metal material with good conductance, and comprises a body 201, a contact part 202 and a leg part 203. The body 201 is in a plate shape corresponding to the fixing slot 105 of the insulating shell 10. The contact part 202 is in a cylindrical shape. It is connected from the front of the body 201 and extends toward the front. The leg part 203 is connected to the rear part of the body 201 and extends with a downward bend.

The body 201 of the first terminal 20 is insertable the fixing slot 105. A protruding part 204 can be forced into the inner walls of the fixing slot 105 to stably fix the first terminal 20 in the insulating shell 10. The contact part 202 of the first terminal 20 extends into the accommodating cavity 104 of the insulating shell 10 and can contact the mating power connector to result in an electrical connection. The leg 203 of the first terminal 20 extends beyond the insulating shell 10 to be soldered on the circuit board to create an electric connection between the first terminal 20 and the circuit board.

The second terminal 30 is made of metal material with good conductance, and comprises a closed metal housing 301 including upper, lower, right and left side walls. A first opening 302 is cut into the upper side wall of the metal housing 301, and a first resilient arm 303 extends downward on one side of the first opening 302. A second opening 304 is cut into the left side wall of the metal housing 301, and a second resilient arm 305 extends inward on one side of the second opening 304. Two third openings 306 are cut on the right side wall of the metal housing 301. Engaging arm 307 extends inward on one side of one of the third openings 306. The other third opening corresponds to the engaging member 107 allowing the one third opening to snap over the edge of the engaging member 107 locking the second terminal 30 to the insulating shell 10.

The metal housing 301 of the second terminal 30 covers the outer surface of the insulating shell 10 and the front of it supports the rear edge of the flange 106 of the insulating shell 10. The engaging arm 307 of the second terminal 30 engages the front edge of the engaging member 107 of the insulating shell 10. Displacement of the second terminal 30 is avoided by the flange 106 and the engaging member 107, which stably secures the second terminal 30 to the insulating shell 10. The first resilient arm 303 and the second resilient arm 305 can extend into the accommodating cavity 104 of the insulating shell 10 through the holes 108 and 109 to contact a terminal of the mating power connector in order to create an electric connection. The underside of the metal housing 301 of the second terminal 30 can be soldered on the circuit board to create the electric connection between the second terminal 30 and the circuit board.

The second terminal 30 includes at least one resilient arm 303 or 305. Therefore, when the second terminal 30 is set on the insulating shell 10, the two resilient arms 303,305 are in the accommodating cavity 104 and can be connected to the mating power connector. That is to say, it uses a method of several contacts to ensure the electric connection between the second terminal 30 and the mating power connector and to increase the clamping force.

Commonly, the first terminal 20 can receive the positive power supply of the mating power connector and the second terminal 30 can be used as a terminal to be grounded (or receive the negative power supply of the mating power connector). Of course, the second terminal 30 can receive the positive power supply of the matching power connector and the first terminal 20 can be used as a terminal to be grounded (or receive the negative power supply of the mating power connector).

When the mating power connector is inserted into the accommodating cavity 104 of the insulating shell 10, their terminals can contact the resilient arms 303,305 of the second terminal 30 thereby connecting them to ground. The contact part 202 of the first terminal 20 may be housed by another terminal of the mating power connector so that it can receive the power supply of the mating power connector. Therefore, the power supply of the mating power connector is received by the first and second terminals 20 and 30 and transferred to circuits on the circuit board by the leg part 203 of

the first terminal 20 and the underside of the metal housing 301 of the second terminal 30.

In this invention the second terminal 30 comprises a metal housing 301 with the entire underside soldered to the circuit board. This will create a great mechanical and  
5 electrical connection that will withstand many insertions and withdrawals

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or central characteristics thereof. The present examples and embodiments, therefore, are to be considered in all respects as illustrative and not restrictive, and the invention is not to be limited to the details given herein.